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WHAT IS CLAIMED IS:

1. A method for producing a low cross-linking-density gel, comprising:
a compounding step for adjusting a flexible silicone gel material to have a specified refractive index, and

a reaction step for causing the flexible silicone gel material adjusted in the compounding step to cross-link in a binding region where cross-linking density is low, thereby producing a low cross-linking-density gel.

2. A method according to claim 1, wherein the specified refractive index is set substantially equal to the refractive index of cores of optical fibers to be connected.

3. A method according to claim 1, wherein a polyorganosiloxane having vinyl groups at its ends is used as a primary agent of the flexible silicone gel material.

4. A method according to claim 1, wherein a cross-linking agent is added in the reaction step.

5. A method according to claim 4, wherein the polyorganosiloxane having covalently bound hydrogen atoms is added as the cross-linking agent.

6. A method according to claim 1, wherein the compounding step and the reaction step are performed in a clean room.

7. A method for producing a low cross-linking-density gel, comprising:
a compounding step for adjusting a flexible silicone gel material to have a specified refractive index,

a synthesizing step for synthesizing a composition by adding a cross-linking agent to the flexible silicone gel material adjusted in the compounding step,

a filling step for filling the composition into a syringe,
a sealing step for sealing the syringe, and
a reaction step for heating the sealed syringe to cause the composition to undergo an addition reaction in a binding region where cross-linking density is low, thereby producing a low cross-linking-density gel in the syringe.

8. A method according to claim 7, wherein the syringe is sealed by mounting a cap in the sealing step.

9. A method according to claim 8, wherein the syringe is mounted in a dispenser for dispensing a predetermined amount of the low cross-linking-density gel by replacing the cap mounted on the syringe by a nozzle after the low cross-linking-density gel is produced in the syringe.

10. A low cross-linking-density gel, characterized in that it is produced by causing a flexible silicone gel material adjusted to have a specified refractive index to undergo an addition reaction so as to cross-link in a binding region where cross-linking density is low.

11. A low cross-linking-density gel according to claim 10, wherein the specified refractive index is set substantially equal to the refractive index of cores of optical fibers to be connected.

12. A low cross-linking-density gel according to claim 10, wherein the flexible silicone gel material is a polyorganosiloxane having vinyl groups at its ends.

13. A low cross-linking-density gel according to claim 10, wherein a cross-linking agent is added prior to the cross-linking reaction and the addition reaction takes place in the presence of a platinum catalyst.

14. A low cross-linking-density gel according to claim 13, wherein the

cross-linking agent is a polyorganosiloxane having covalently bound hydrogen atoms.

15. A low cross-linking-density gel according to claim 13, wherein the composition after being filled in the syringe is caused to undergo the addition reaction by being heated during the cross-linking reaction.

16. A low cross-linking-density gel according to claim 10, wherein the low cross-linking-density gel is produced in a clean room.